

CLAIMS

I Claim:

1. A method of analyzing samples of textiles, wood pulp and plant products comprising the steps of:  
5 producing a cold water extract by extracting the samples with cold water;  
treating insoluble materials from the cold water extract step with dilute hot acid to yield an acid extract;  
neutralizing the acid extract;  
10 treating the neutralized acid extract with an alcohol to make an alcohol precipitate;  
redissolving the alcohol precipitate in an aqueous solution; and  
analyzing the aqueous solution to reveal a carbohydrate multimer pattern.
- 15 2. The method of analyzing of Claim 1, further comprising the step of analyzing soluble mono- and oligosaccharides contained in the cold water extract;
3. The method of analyzing of Claim 1, wherein the alcohol used is selected from the group consisting of ethanol and 1-propanol.

4. The method of analyzing of Claim 3, wherein both ethanol and 1-propanol are used to make alcohol precipitates, and wherein the step of analyzing the aqueous solution compares redissolved ethanol precipitate to redissolved 1-propanol precipitate.

5 5. The method of analyzing of Claim 1, wherein the redissolved alcohol precipitate is subjected to enzymatic digestion with a series of endoglycosidases and exoglycosidases prior to the step of analyzing, and wherein the results of different enzymatic digestions are compared in the step of analyzing.

6. The method of analyzing of Claim 5, wherein the  
10 endoglycosidases are selected from the group consisting of endo  $\beta$ -1,4-glucanase, exo- $\alpha$ -1,4-glucanase and  $\alpha$ -1-4-glucan glucohydrolase.

7. The method of analyzing of Claim 1, wherein heavily laundered textile samples are distinguished from less heavily laundered textile samples by a showing of fewer carbohydrate multimers when the extract is analyzed.

15 8. The method of analyzing of Claim 1, wherein highly processed wood pulp is distinguished from less highly processed wood pulp by a showing of fewer carbohydrate multimers when the extract is analyzed.

9. The method of analyzing of Claim 1, wherein a food grain is distinguished from other food grains by the pattern produced by analyzing the aqueous solution.

10. A method to monitor waste water for evidence of domestic laundry activities comprising the step of analyzing the waste water looking for polysaccharide multimers, said multimers being evidence that the waste water contains effluent from laundering cotton fabric.

11. A method to identify the species of a sample of wood or other cellulosic material of plant origin comprising the steps of:

10 extracting specimens of known species of wood or cellulosic material with dilute hot acid to produce known extracts;  
analyzing each known extract to reveal a pattern of carbohydrate multimers diagnostic of the species from which the extract was made;  
15 extracting the sample of wood or cellulosic material with dilute hot acid to produce a sample extract;  
analyzing the sample extract to reveal a pattern of carbohydrate multimers characteristic of the sample extract; and  
20 comparing the pattern of the sample extract to the patterns of the known extract to determine the species of the sample.

12. The method of Claim 11 further comprising the steps of neutralizing the known extracts, treating the neutralized known extracts with an alcohol to make a known alcohol precipitate, redissolving the known alcohol precipitate in an aqueous solution prior to the step of analyzing the known extracts,  
5 neutralizing the sample extract, treating the neutralized sample extract with an alcohol to make a known alcohol precipitate, redissolving the sample alcohol precipitate in an aqueous solution prior to the step of analyzing the sample extract.

13. The method of Claim 12, wherein the alcohol used is selected from the group consisting of ethanol and 1-propanol.

10 14. The method of Claim 13, wherein both ethanol and 1-propanol are used to make alcohol precipitates, and wherein the steps of analyzing the known extract and the sample extracts compare redissolved ethanol precipitates to redissolved 1-propanol precipitates.

15 15. The method of Claim 12, wherein the redissolved alcohol precipitates are subjected to enzymatic digestion with a series of endoglycosidases and exoglycosidases prior to the steps of analyzing, and wherein the results of different enzymatic digestions are compared in the steps of analyzing.

16. The method of Claim 15, wherein the endoglycosidases are selected from the group consisting of endo  $\beta$ -1,4-glucanase, exo- $\alpha$ -1,4-glucanase and  $\alpha$ -1-4-glucan glucohydrolase.

17. A method of identifying the source of dust in air by using the  
5 method of Claim 11 on dust filtered from an air sample.

18. A method to releasing glycan oligomers from glycogen comprising the steps of:

10. suspending the glycogen in aqueous medium;  
adding an equal volume of 2N hydrochloric acid to yield acidified  
solution; and  
boiling the acidified solution to obtain alpha limit dextrin.

19. The method according to Claim 18, wherein the glycogen is obtained from human liver tissue, and wherein the alpha limit dextrans are analyzed  
15 to differentiate glycogen from normal livers from glycogen from livers of patients with glycogen storage disease.

20. The method according to Claim 19, wherein the glycogen storage disease is type II glycogenosis.

21. A method of characterizing glycogen types comprising the steps of:

suspending a glycogen in aqueous medium;

adding an equal volume of 2N hydrochloric acid to yield acidified solution;

boiling the acidified solution to obtain alpha limit dextrin;

neutralizing the alpha limit dextrin and analyzing the alpha limit dextrin to characterize the glycogen.

22. A method of analyzing samples containing plant gum comprising the steps of:

producing a cold water extract by extracting each sample with cold water;

treating insoluble materials from the cold water extract step with dilute hot acid to yield an acid extract;

neutralizing the acid extract; and

analyzing the water extract and the acid extract to reveal two different carbohydrate patterns.

23. The method according to Claim 22, wherein the patterns of different samples are compared to identify a source of plant gum.

24. The method according to Claim 22, wherein the patterns are used to authenticate works of art.

5                    25. The method according to Claim 22, wherein the patterns are used to identify a source food additives.

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